FIG. 1. Role of Members of the Serpin Superfamily

Serpin	Abbreviation[i]	Role[ii]	Primary function/target	Reference	Species[iii]
α_1-Antichymotrypsin	ACT	In	chymotrypsin	a	M
α_1-Antitrypsin	AAT	In	elastase	b	M/Am
α_2-Antiplasmin	A2AP	In	plasmin	c	M
	Acp76A	O	*reproductive system*	d	*dme*
Accessory gland protein					
Angiotensinogen	ANGT	O	non-inhibitory, hormone precursor	e,f	M
Antithrombin	ANT	In/O	thrombin, factor Xa, anti-angiogenesis	g,h	M/F
Blood fluke serpins	Ac	N	inhibitory RCL, target unknown. *Schistosoma haematobium* major antigen	i	*sma/ja/ha*
Bomapin	Bomapin	In	inhibitory activity vs serine proteinases	j	*hsa*
Bombyx mori serpins	Ac	In, N	inhibitory activity vs serine proteinases	k	*bmo*
C1 inhibitor	C1-I	In	complement C1 esterase	l	M
Corticosteroid-binding globulin	CBG	O	non-inhibitory, hormone binding	m	M/Am
Factor Xa-directed anticoagulant	Ac	In	reversible noncovalent factor Xa inhibition	n	*aae*
Glia-derived nexin	GDN	O/In	neurite outgrowth, thrombin	o	M
Heat shock protein 47	HSP47	O	chaperone, folding, collagen processing	p	M/F
Heparin cofactor II	HEPII	In	thrombin/chymotrypsin	q,r	M/Am
Kallistatin	KAL	In	tissue kallikrein	s	M
Limulus intracellular coagulation inhibitor	LICI	In	factor C, limulus clotting enzyme, other serine proteases	t	*ttr*
Manduca sexta alaserpin (12 splie variants)	SERP-1	In, N	some show inhibitory activity vs serine *proteinases*	u	*mse*
Maspin	Maspin	In	tissue-type plasminogen activator/prevents metastasis	v,w	M
Monocyte/neutrophil elastase inhibitor	MNEI	In	proteinase 3, cathepsin G	x	M
Myeloid and erythroid nuclear-termination stage specific protein	MENT	O	chromatin condensation	y	*gga*
Nematode	Ac	N	many with inhibitory RCL, targets unknown	z	*cel*
Neuroserpin	NEUS	In	plasminogen activator, urokinase, plasmin	aa	M
Ovalbumin	OVAL	N	non-inhibitory	bb,cc	A
PI6	PI6	In	cathepsin G	dd	M
P18	P18	In	trypsin-like proteinases	ee,ff	*hsa*
P19	P19	In	granzyme B	gg	M
Pigment epithelium-derived factor	PEDF	O	neurotrophic factor	hh	M
Plant serpins (e.g., protein Z)	Ac	In	inhibitory activity vs serine proteinase, target unknown	ii,jj	P
Plasminogen Activator Inhibitor-1	PAI-1	In	tissue-type plasminogen activator	kk	M

Plasminogen Activator Inhibitor-2	PAI-2	In	tissue-type plasminogen activator, intracellular signaling	ll,mm	M
Protein C Inhibitor	PCI	In	protein C	nn	M
Regeneration-Associated Protein	RASP-1	In	liver regeneration, human homolog protein Z potent FXa inhibitor	oo	*rno*
Sea lamprey serpin	Ac	N	inhibitory RCL, target unknown	pp	*pma*
Signal crayfish	Ac	N	inhibitory RCL, target unknown	qq	*ple*
Squamous Cell Carcinoma Antigen-1	SCCA-1	In	inhibitory activity vs papain-like cysteine proteases	rr	*hsa*
Squamous Cell Carcinoma Antigen-2	SCCA-2	In	inhibitory activity vs serine proteinases	ss	M
Thyroxine-binding globulin	TBG	O	non-inhibitory, hormone binding	tt	M/Am
TP55	Megsin	O	megakaryocyte maturation	uu	*hsa*
Uterine milk protein	UTMP	In/O	activin binding, inhibitory activity vs aspartic proteases	vv,ww	M
Viral serpin CmA	CmA	In	interleukin-converting enzyme 1β	xx	V
Ovine uterine serpine	OvUS	O	immunosuppressive properties	yy	

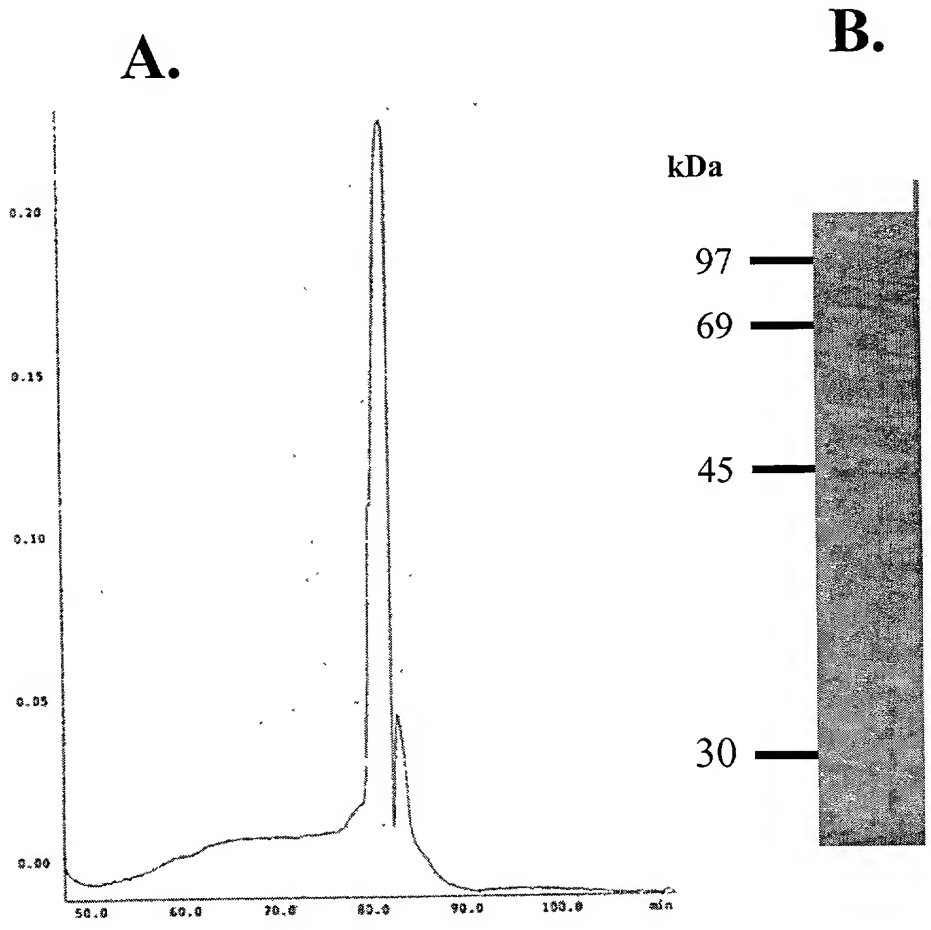
[i] (Ac) Identified by its individual accession.

[ii] (In) Protease inhibitor; (O) other function; (N) not known.

[iii] Where sequences are present in more than one species, the class is given. (A) avian; (Am) amphibian; (F) fish; (M) mammalian; (P) plant; (V) viral. Italicized labels refer to individual species: *(aae) Aedes aegypti; (bmo) Bombyx mori; (cel)Caenorhabditis elegans; (dme) Drosophila melanogaster; (gga) Gallus gallus; (hsa) Homo sapiens; (mse) Manduca sexta; (ple) Pacifastacus leniusculus; (pma) Petromyzon marinus; (rno) Rattus norvegicus; (sma/ja/ha). Schistosoma mansoni, Schistosoma japonicum, Schistosoma haematobium; (ttr) Tachypleus tridentatus.*

[a]Kalsheker 1996 (review); [b]Patterson 1991 (review); [c]Holmes et al. 1987; [d]Wolfner et al. 1997; [e]Stein et al. 1989; [f]Arakawa et al. 1965; [g]O'Reilly et al. 1999; [h]Lane et al. 1992 (review); [i]Blanton et al. 1994; [j]Riewald and Schleef 1995; [k]Sasaki 1991; [l]Zeerleder et al. 1999 (review); [m]Pemberton et al. 1988; [n]Stark and James 1998; [o]Zurn et al. 1988; [p]Nakai et al. 1992; [q]Tollefsen et al. 1982; [r]Church et al. 1985; [s]Wang et al. 1989; [t]Miura et al. 1994; [u]Jiang and Kanost 1997; [v]Sheng et al. 1998; [w]Zou et al. 1994; [x]Sugimori et al. 1995; [y]Grigoryev et al. 1992; [z]Whisstock et al. 1999; [aa]Krueger et al. 1997; [bb]Wright 1984; [cc]Stein et al. 1989; [dd]Scott et al. 1999a; [ee]Sprecher et al. 1995; [ff]Dahlen et al. 1998; [gg]Bird et al. 1998; [hh]Steele et al. 1993; [ii]Lundgard and Svensson 1989; [jj]Rasmussen et al. 1996; [kk]Reilly et al. 1994 (review); [ll]Dickinson et al. 1998; [mm]Astedt et al. 1998 (review); [nn]Suzuki et al. 1983; [oo]New et al. 1996; [pp]Robson et al. 1998; [qq]Liang and Soderhall 1995; [rr]Schick et al. 1998; [ss]Schick et al. 1998; [tt]Pemberton et al. 1988; [uu]Tsujimoto et al. 1997; [vv]McFarlane et al. 1992; [ww]Mathialagan and Hansen 1996; [xx]Ray et al. 1992; [yy]Peltier et al.2000.

FIG. 2

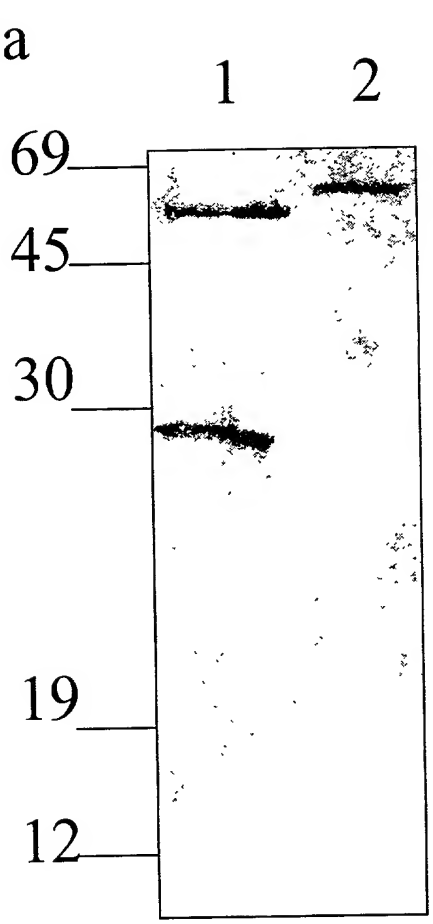


C.

HRSPVEDVCTAKPR **DIPVNPMCIYR** SSEK**KATEGQGSEQKIPGATNR** RVW
ELSKANSHFATAFYQHLADSK NNNDNIFLSPLSISTAFAMTK LGACNNTL
TQLMEVFK **FDTISEKTSDQIHFFFAK** LNCRLYRKANK **SSELVSANR** LFGD
KSITFNETYQDISEVVYGAK **LQPLDFKGNAEQSR** LTINQWISNKTEGRIT
DVIPPQAINEFTVLVLVNTIYFKGLWKSK **FSPENTRKELFYK** ADGESCSV
LMMYQESKFRYR **RVAESTQVLELPFKGDD** ITMVLILPKLEKTLAKVEQEL
TPDMLQEWLDELTETLLVVHMPR **FRIEDSFSVKEQLQDMGLEDLFSPE** KS
RLPGIVAEGRSDLYVSDAFHKAFLEVNEEGSEAAASTVISIAGR SLNSDR
VTFKANRPFLVLIR **EVALNTIIFMGR** VANPCVD

FIG. 3

A.


kDa
1
2
69
45
30
19
12

B.

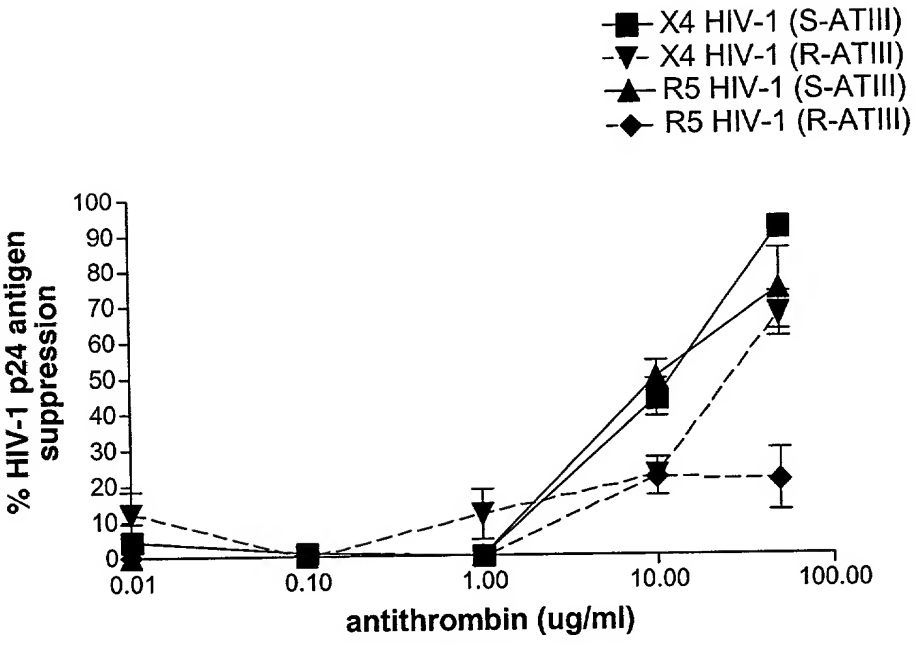
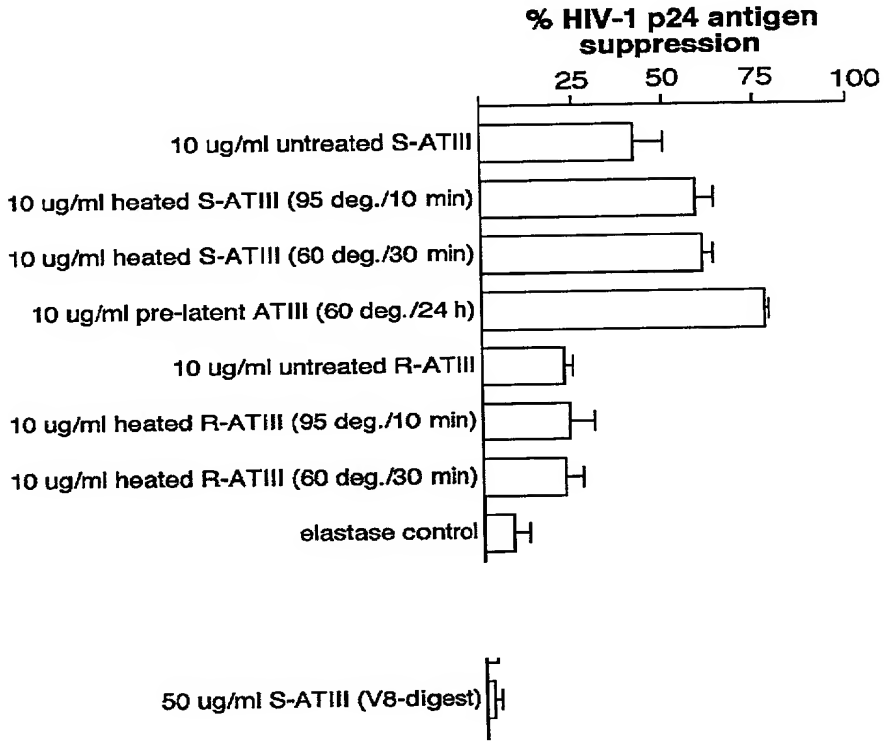
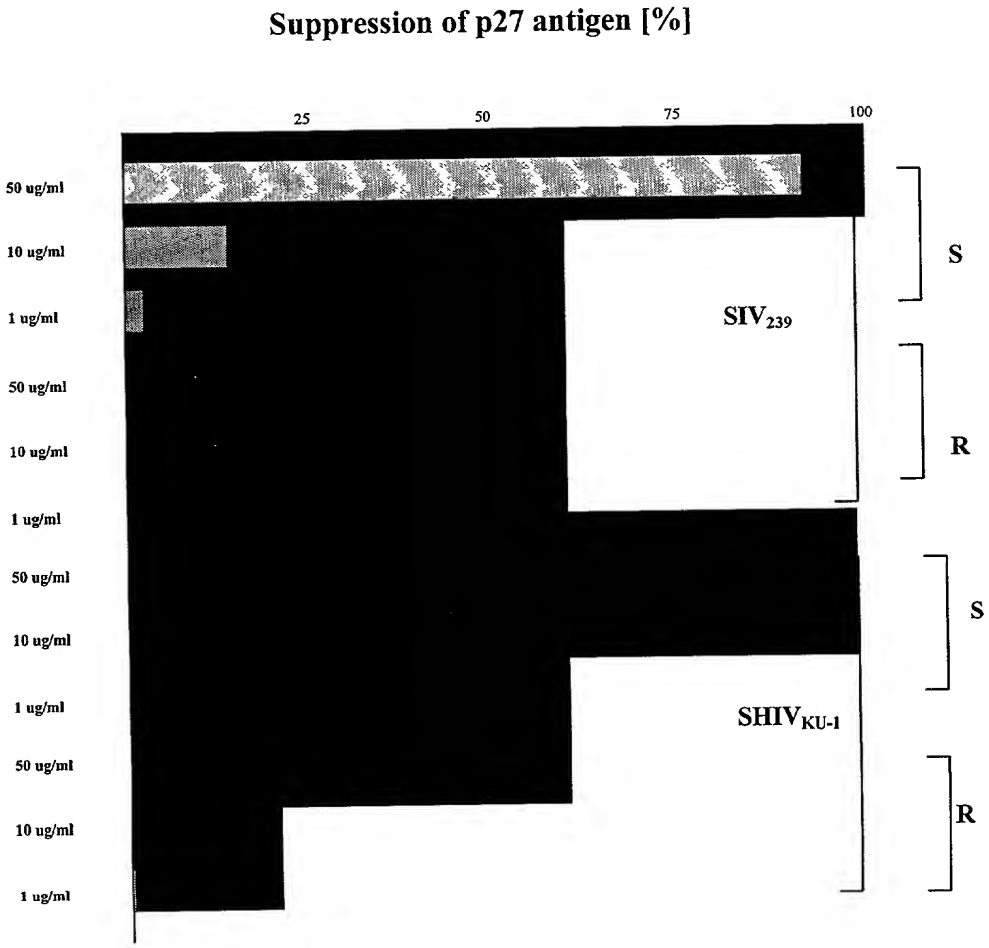

X4 HIV-1 (S-ATIII)
X4 HIV-1 (R-ATIII)
R5 HIV-1 (S-ATIII)
R5 HIV-1 (R-ATIII)
% HIV-1 p24 antigen suppression
100
90
80
70
60
50
40
30
20
10
0
0.01
0.10
1.00
10.00
100.00
antithrombin (ug/ml)

FIG. 4

A.


% HIV-1 p24 antigen suppression
25
50
75
100
10 ug/ml untreated S-ATIII
10 ug/ml heated S-ATIII (95 deg./10 min)
10 ug/ml heated S-ATIII (60 deg./30 min)
10 ug/ml pre-latent ATIII (60 deg./24 h)
10 ug/ml untreated R-ATIII
10 ug/ml heated R-ATIII (95 deg./10 min)
10 ug/ml heated R-ATIII (60 deg./30 min)
elastase control
50 ug/ml S-ATIII (V8-digest)

B.


Suppression of p27 antigen [%]
25
50
75
100
50 ug/ml
10 ug/ml
1 ug/ml
50 ug/ml
10 ug/ml
1 ug/ml
50 ug/ml
10 ug/ml
1 ug/ml
50 ug/ml
10 ug/ml
1 ug/ml
S
SIV239
R
S
SHIVKU-1
R